EFFECTIVENESS OF MODERN TECHNOLOGICAL TOOLS IN POLICING PRACTICES AND CRIME CONTROL IN INDIA: A STUDY WITH SPECIAL REFERENCE TO UTTAR PRADESH

Synopsis of the Research Proposal

Submitted for the Registration in the

Ph.D. Programme

In

Law

By

Vaishnavi Gupta

(25JPPHNDLS008)

Under Supervision of

Dr. Harish Kumar Verma

Associate Professor and Dean**,** ICFAI Law School

ICFAI Law School

The ICFAI University, Jaipur

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Research Scholar Supervisor

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List of Abbreviations –

- **AI –** Artificial Intelligence
- **UP –** Uttar Pradesh
- **FIR –** First Information Report
- **CCTNS -** Crime and Criminal Tracking Network and Systems
- **RTI –** Right to Information
- **BNS –** Bharatiya Nyaya Sanhita
- **BNSS –** Bharatiya Nagarik Suraksha Sanhita
- **BSA –** Bharatiya Sakshya Adhiniyam
- **VEDA -** Voice-Enabled Digital Assistant
- **CSRNet** - Congested Scene Recognition Network
- **MCNN** - MultiColumn Convolutional Neural Network

Abstract –

The technology has accelerated the speed of work and reduced unnecessary workload. It not only helps in ordinary work but also in advance level of work. The role of modern software has shifted the reliability of manual work to modern AI tools for prevention and detection of crime. Earlier, the policing practices was all about paper work but now, the digital tools are used for maintaining the records, data, statistics, recording FIR, etc. It saves time and is efficient enough for them to ascertain the information to a larger extent, especially in Uttar Pradesh.

With the mounting of population, it became backbreaking to solve the cases with traditional methods. There was an urge to launch AI tools for modern policing practices. The growth of population led to increase in crimes. Nevertheless, challenges related to training of modern software, operating tools, adhering legal rules, demands a structured research to examine the impact and productivity of these software.

The study is based on the hypothesis that implementation of modern software is of utmost importance. The police personnel have adopted the techniques to use and implement to solve the cases. It has positive impact on solving cases on time and restrain the wastage of energy on futile affairs. Besides being effective, there are legal challenges, technical challenges faced by police department while investigating or complying with procedures.

The primary aim of the study is to understand the judicial response regarding admissibility of technology. To identify the level of awareness of new software and the efficacy of software in detection. The study also aims to pinpoint the challenges faced by them and how they are adapting AI tools in their day to day work.

To achieve these objectives, the study adopts a mixed study research methodology of empirical as well as doctrinal method. The primary data will be collected through questionnaire, interviews from police personnel, cyber experts, judges, lawyers. Whereas, the secondary data will be collected from government reports, policy, statutes.

<u>KEYWORDS</u> – **Modern Technological Tools, Policing Practices, Effectiveness, Crime Control**

1) Introduction –

Earlier, policing system used traditional approaches for detection and prevention of crime. The traditional methods like foot patrolling, surveillance, informer network(mukhbir system), filing FIR manually, taking reports from village chowkidars, temporary roadblocks to check individuals and vehicles, maintaining crime registers at police stations, taking reports, maintaining case diaries, questioning people who were present at the crime scene, etc, were being used by the police personnel. These techniques were low result- oriented. This ground led to adaptation of modern technological tools for policing.

Now, the police personnel started using advanced modern tools like online filing of FIR, maintaining records digitally, keeping electronic records with backup and high security, monitoring the crowd or public through CCTV cameras, using special cameras to detect the speed of vehicles, and so on. These techniques saved a lot of time and energy and ensure transparency in functioning of police in India.This technology- driven wind swayed the traditional methods and implemented modern methods. Not only government bodies but also, private bodies began to shift to digital society. This would boost the growth of all sectors, whether private or public, at each levels.

Policing practices, especially, in Uttar Pradesh has evolved into smart policing systems. It is crucial for speedy disposals, efficiency in investigations, data management, tracking resources in policing. The adoption of technological tools will assist the police personnel to complete the task on time and without any interruption of non- availability of technology.

<u>Definitions</u> :-

- **Artificial Intelligence (AI)[1] -** AI refers to systems that display intelligent behaviour by analysing their environment and taking action – with some degree of autonomy – to achieve specific goals.

[1] Sofia Samoili, European Comission, quoted in Scientific Foresight Unit, *Artificial intelligence: How does it work, why does it matter, and what can we do about it?*(2020).

- **Law Enforcement Software –** these are tools, applications created for police technology. These softwares assist police officers for public safety, smooth management, recording data, searching of records, digital evidence, detection of crimes, etc.

- **Modern Policing –** it is the use of technology for betterment of process, improving efficiency and maintaining transparency.

Shift from Manual to Digital Systems –

The Indian Police System started from the British era. The Police Act, 1861 was passed by Legislative Council of India. It received assent of Governor General on 20th May, 1861. Although, it is the oldest act, it still governs the police force of central, North, East India. It is applicable to those states only, who do not have their own statute. The transformation from manual paper work to digitalization was a significant move by police force. Each and every step from the beginning, till the end, was all about paper work.

The traditional approach of police personnel was to get information from informers (mukhbirs) and detect organized crimes. The statements and confessions given by suspects and witness were written manually. The tracking of suspects was done physically, without using any digital tool. duties of police personnel were to maintain registers, carry general diary/ case diary, filing of First Information Report (FIR) manually, observing circumstantial evidence, etc., therefore, it was time consuming. At present, FIR can also be registered digitally, information can also be given through electronic devices, summons/ notice can be issued online, evidences can be recorded through mobile phones and so on. These small steps towards digitalization has made police work so stable and effortless that it accelerated the working habit of police by shortening of process to make it less time consuming.

Modern Software: Necessity for Uttar Pradesh -

As per **Census 2011 Data[2],** the total population of Uttar Pradesh is **19,98,12,341**,

[2] National Crime Records Bureau [NCRB], 2023. *Crime in India2023.* Ministry of Home Affairs, Government of India.

approximately **199.8 million.** As per census, **Uttar Pradesh** was the most populated state in India. The estimated population in 2023 was **2364.84 (in lakhs).** As per 2026 also, Uttar Pradesh is known to be **the most populated state in India**. The population is distributed in urban and rural areas, **urban** : 31.1%(4,44,95,063) and **rural area** : 68.9% (15,53,17,278)[3]. Due to high population, the workload of policing is need of the hour. It becomes difficult for the police force to manage public and keep the track of crimes and criminals. According to **National Crime Records Bureau (NCRB),** Uttar Pradesh has the highest crime record in India.

Artificial intelligence is defined as a powerful tool which helps human beings to make their work smooth and accessible. It multiplies the speed of task much faster than humans could ever do. AI can even do those tasks which would never possibly be done by humans. AI has been spread like disease and its scope is newly introduced in different statutes. The evidentiary value of electronic devices, electronic communications, electronic records, etc., has increased. Earlier, the contents of documents used to have value in courts but now, times have changed the system. The question of admissibility of electronic devices, records and artificial intelligence has emerged in courts. The government of Uttar Pradesh has formed new rules, guidelines as well as operations for police department, where they will be trained about modern softwares launched by government.

Software and digital tools used in UP -

The modern technological tools are adopted in UP with aim of ensuring efficiency, accuracy, investigation, prevention of crime and to detect , prevent and dispose of case in prompt manner. There was need to adopt tools in the state as UP is densely populated and has high cases of crimes. To control the crime and monitor the individuals, it was important to implement new tools to solve cases and conduct investigation. The tools in UP are-

1. **YAKSH** – this tool helps in ranking criminals. It is a link between gang members and their associates. It helps in recognizing face as well as voice from CCTV footage to identify suspects.

[3] Office of the Registrar General & Census Commissioner, India, Census of India 2011

2. **Crime GPT** – this helps police officers to interact with database. The officers can use this tool to ask any questions. Police can investigate by asking questions related to criminals or gangs and can gain information from digitized records.

3. **Trinetra 2.0** – it helps in identifying the faces of offenders during security checks from CCTV feeds and clear/ unclear photos uploaded. It is particularly used for defense

4. **E- saakshya app** – this is used to record digital evidence in criminal cases. And are digitally geotagged. No one can tamper with the evidence as it is developed by NIC, which is a system of digital evidence designed to securely keep audio- video recordings as an evidence.

5. **AI – integrated drones** – it detects unusual activity.

6. **Body worn camera** – it assist, especially, traffic police men to ensure public safety, collect evidence.

7. **Smart Sensors and Internet of Things (IoT)** – this detect sound of gunshot / glass breaking. It alo helps in anticipating crime patterns.

8. **UP COP App** – it is for filing electronic FIR for lost items.

9. **Deepfake detection** – cyber cell of UP verifies the videos of fake profiles by scanning faces, eyes, lip sync.

10. **Citizen Financial Cyber Fraud Reporting and Management Systems (CFCFRMS)** – the platform for money related crimes, track the linked bank accounts.

11. **JARVIS** – helps in detecting the threat in prisons. CCTV is launched in most of the prisons to keep an eye on prisoners.

Government Strategies and Operations –

UP government has launched many apps and tools for policing. The government aims to make the state AI centric and boost digital policing. It has taken steps towards growth of police department and reduction of crime rate in UP. As on 1st January, 2024, there are total 75 cyber crime police stations in UP. The highest amongst all states.

2) Literature Review –

1. **Princy Singla (2025),** in his article, evaluates the impact of technology and how it is helping in solving criminal cases. It also evaluates the admissibility of digital evidence in courts of India and other jurisdictions. The author has discussed the overview of BSA, 2023 and IT Act, 2000. It states that the conditions given under provisions of these two statutes, must be complied with. The other territory which is discussed in short is EU countries, having a mixed approach of accepting the evidence.

2. **Patricia Haley & Darrell Norman Burrell (2025),** in this paper, the author has focused on the transformation that took place due to AI which helps in observing criminal behavior and identifies crime trends. This only talks about the importance of AI in policing has greater impact on health and safety of society as it assist the police in reducing the harm caused to innocents and any kind of violence.

3. **N. Ramachandran & Mahajan Harshal Rajesh (2025),** in this study, the application of AI helps in identifying the patterns of crime, predicting results, interacting with crime GPT. In forensics, investigations, data analysis, public security, beat patrolling, AI helps in law enforcement, it has transformed the complex situations into simple and timesaving process.

4. **Kommi Prathap Sivakishore (2025),** in this study, the tool SmartPolice translates the language into another legal language. Project GARUDA, VEDA, are the tools which

discuss the connection with police officers. The excellent tools are used for the police officers like CCTNS helps in finding out the data amongst millions of records. VEDA listens to the victims complaint without any judgement and records in audio- video, which the courts can rely on. Garuda is drone software which keeps an eye on the gatherings, overcrowded areas, etc.

5. **Alok Kumar & Rahul Gupta (2025),** this article deals with policing in Goa. Initiatives have been taken in Goa for national security, spotting the scammers of deepfakes, phishing, etc., using QuickPass App and TRACK Center. Goa police has adopted many tools used in different countries like Singapore and New York City.

6. **Devesh Rajadhyax (2025),** in his study generally talks about need for AI in law enforcement. AI collects sensitive data like criminal records, information of sufferer, which must be protected as disclosure of details might lead to risk. There is no clear strategy for AI adoption in law enforcement, this is the reason why, police has not been fully adapted with technology yet.

7. **Mohit Garg (2025),** his study investigates the policing techniques used in **Prayagraj Maha Kumbh Mela.** AI applications like YOLOv5, LSTM- based traffic modeling, CSRNet, drone, CCTV networks, smart glasses, NLP (Natural Language Processing), MCNN (Multi Column Convolutional Neural Network) and many more. All these AI tools helped in finding lost people in crowd, identifying faces from CCTV feeds, monitoring VIP areas, etc. this article gives real world expeience by using AI at large scale and on millions of people at the same time within two- three months. If these tools were not available then how it would be possible to manage such huge gathering in a city.

8. **Munauvar Khan (2025),** in his study, discuss that how AI helped in re-opening of cold cases which were left unsolved due to traditional methods used by police. It advanced digital forensics too, as earlier, due to manual work the time consumption was more and it led to human error. AI took care of all the flaws and streamlined the whole process.

9. **Richa Rohatgi & Akanchha Kumari (2025),** the authors especially talked about poroscopy and fingerprint analysis. When police collects evidence, sweaty pores makes difficult for them to identify the person which would hamper the investigation but when AI entered, it advanced the technology and helped in policing practices.

10. **Shaveta Gagneja (2025),** this paper tells that AI not only helps in investigation, but also in crime scene reconstruction. AI recognizes patterns, fingerprint pattern, voice pattern, facial patterns. It bridges the gap from prediction to prevention of crime. It also talks about "hotspot analysis" which aids in analyzing the databases collected by agencies. It mentions few countries, using this technology to combat criminal activities occurring globally, like Japan, USA, South Korea.

11. **Arun Kumar et al. (2025),** in their study reveals that AI is integrated into the law enforcement strategies of other countries like USA, UK, UAE, Australia. Now, considering the challenges faced by India in adopting AI in policing , is overburdened with the strength of population, restricted resources, obsolete infrastructure.this paper study the best practices adopted across the globe and how it can be adopted in India. The countries studied here are- United States, United Kingdom, China, Singapore, Australia, UAE. It also studies the barriers to implementing in India.

12. **Ram Gopal Garg & Sankalp Rai (2025),** this study states that AI has both advantages and disadvantages. When AI is implemented, the number of complications and problems occur at the same time. There are few applications in Policing that has transformed the technology worldwide, like predictive policing, facial recognition technology, crime mapping and hotspot analysis, crime detection and investigation, data analysis and pattern recognition. The difficulties while implementing AI, focused here are privacy concerns, law regulations, public distrust, threat to civil liberties.

13. **Shakti Prakash (2025),** in his study, tells how AI assist in different applications of forensic science. Where the ability of human being ends, the ability of AI is superabound.

AI helps police officers in extracting data, in forensic science, more accurately. The author has aimed to combine the powers of human being and AI to make easier for the court and police officers. This will improve the whole scenario of solving cases and doing investigation.

14. **Ravaliya Radhaben Bhimabhai (2025),** in this study, the role of technology in investigation. Few modern tools which keeps surveillance, biometric analysis, etc. the provisions of digital evidence are also analysed. The impact of technology on privacy is also discussed. The challenges and the need of technology are assessed.

15. **Nilanjan Chakraborty et al. (2025),** in their study, examines only predictive policing technology. The prevention of crime, while using this technology, helps in determining the crime patterns. It assesses the alignment of this technology with social and civil rights. It studies international practices as well.

16. **Harryanto Bujang (2024),** his study deals with AI in Malaysia Police. It assess that AI helps police officers to be efficient and effective. This study deals only with Malaysia Police and its importance. Few instances of AI, such as, facial recognition, predictive policing, and so on, are also used in Malaysia.

17. **Vedha Valli (2024),** in this study, generally talks about the technology evolved policing system in India. The number of cases solved by every state, using tools provided to police personnel. There are many states using special tool especially made for tha state and how it is affecting the method of case solving. States like Tamil Nadu, Karnataka, Kerala, Delhi are using differnts applications. Though, there are challenges faced by them are also discussed.

18. **Kunal Kanwat (2024),** in his study elaborates the role of forensic evidence. The evaluation of legal provisions and application of it in courts is done. It also examines the use in India, whether it is restrictive or extensive. The study explains how the evidence is used in crime scenes.

19. **Meena Rani (2024),** this paper, examines the impact of AI in policing system in India. There can be both consequences that should be considered. There are many applications and initiatives taken by government from different states where AI is applied to monitor cases.

20. **Razia (2024),** this paper deals with cyber crimes and their way of investigation. It evaluates the traditional forensic principles in digital technological crime. It examines the judicial response to cyber crimes and investigation. The legislative measures in cyber forensic is also examined. It deals with the application of digital forensics in cyber investigation at nation level.

21. **Alexandru Ioan (2024),** this article deals with AI in policing. There are challenges in policing as privacy is infringed, algorithm is misused and reduced accountability of humans. The link between AI and modern policing is established but tools and its effect of implementation is not discussed.

22. **Matthias Wienroth (2023),** this article discuss the role of technologies in policing. It highlights the requirement for further empirical research. It analyses the drone technology used by police in Norwegian. An overview of sensor systems is stated in this article.

23. **Greg Friese (2023),** in this article, the editor talks about the pros and cons of "AI and policing" in Netherlands. It shares the general opinion that AI helps in policing practices and on the other hand, AI can be misused by criminals.

24. **Chandrashekhar S. V. & Nandini Devarmani (2023),** in their study, they have elaborated smart policing in modern law enforcement. The abbreviation of SWOC, stands for strengths, weakness, opportunity, challenge. Every aspect of this abbreviation is discussed in this paper. It also talks about misuse of these tools and what consequences will take place, if not properly governed.

25. **Manoj Meena & Aishvarya Joshi (2023),** this journal article, published in NFSU Journal of Law & Artificial Intelligence, contributes an overview of AI Policing in India. It also provides the best practices adopted by different countries towards AI policing. It mainly focuses on CCTV cameras which helps in face recognition of offenders and number of CCTV cameras installed. It concisely covers the initiatives taken by the government towards AI Policing. Few states which are discussed in this article are Haryana, Maharashtra, Uttar Pradesh, Telangana.

26. **Gulyamov Said & Samet Tatar (2023),** the author states the importance of AI in investigation. The impact of AI will be beneficial and efficient, if used for a longer period. It analyses the international organizations report for the implementation of AI. It also deals with the challenges, positive impact, long term goals, effective use and society. The transformation of way of investigation will be converted into modern type of investigation which would reduce the effort and time as well.

27. **Akshaysinh Nitirajsinh Chudasama (2022),** offers a comprehensive analysis on amendments made in code of criminal procedure. The usage of technology, innovations while assessing the information and procedure of reporting information to police.

28. **Eric L. Piza & Brandon C. Welsh (2022),** this article talks about evidence based policing. It is being recognized globally including developed countries. It is based on various case studies which states that integration of EBP and field practice would help police in performing their duties.

29. **Gangurde Amita R (2022)** studies the impact of COVID-19 on workload of police and stress issues in this period. This paper focuses on Mumbai city only.

30. **Shubhra Upadhyay (2022),** this study only analyse about the job satisfaction of police officers between male and female. It extends to the region of Maharashtra state. The job satisfaction is only upto three post of police department, i.e., Assistant sub inspector, police inspector, head constable.

31. **Rohilla Komal (2022)** their study discusses about the challenges in cyber policing and investigation. The study analysis the legal framework for investigation in cyber crimes as well as cyber policing. The Legal reforms to be adopted for enhancing the actions to be taken in cyber policing.

32. **M. A. Yavorsky (2021),** the author is explaining that the information technology is applied and to what extent it is speeding up the investigation. It is mainly focusing on the prison system that is digitally transformed and the current challenge confronted by the enforcement system.

33. **Ishmael Mugari & Emeka E. Obioha (2021),** this paper deals with predictive policing in USA, Germany, Netherlands, UK. This paper determines the effectiveness and challenges of predictive policing in different countries. Predictive policing is defined as the software which helps police to identify the place of criminal activity. It discussed the positive impact of predictive policing and few areas where it requires modification.

34. **Andrew M. Fox et al. (2021),** in their study, the strategies for policing are risk terrain modeling(RTM) and social network analysis (SNA). These are implemented in few cities of USA. The impact of technology has been noticed in these three cities. It also tells that for these software, special training is required. The department must also look into the cost and consequence of installing the above mentioned software. Though, it is beneficial for many agencies but trained people can only use it properly.

35. **Ryan Jenkins & Duncan Purves (2020),** this paper talks about ethics of AI and predictive policing. What information to be collected and what should not be collected is stated in this study. The role of police personnel and their special tasks while investigating. The aim and purpose of predictive policing is elaborately discussed.

36. **Sharma Naveen (2018)** in his study talks about the structure of police department in

Himachal Pradesh and focuses on improving the relationship of public and police. It shows the need to reform policing system for betterment of society.

37. **Azad Sandeep (2018)** in his study explains public- police relationship and focuses on efficiency of police department especially in Shimla, Himachal Pradesh. The factors involved in non- functioning of police system and job satisfaction.

38. **Christopher Rigano (2018),** in this article specifically, talks about public safety video and image analysis, gunshot detection, DNA analysis and crime forecasting. It speaks about AI and its implimentation in policing tools.

39. **Namit Kumar (2018),** in his study, talks about whether the tools are effective for Chandigarh police and its impact on society especially focusing in Chandigarh. Training given to police personnel is evaluated and the tools used are studied.

40. **Patrick Perrot (2017)** in the study has emphasized on the importance of knowing the old pattern of criminals. This is the reason where AI is crucial to be adopted in policing. Police uses past criminal records to anticipate the criminal activities which would help them to prevent happening of crimes. This will help them to improve their future actions and strategies.

41. **Elizabeth E. Joh (2017)** the author establishes the direct relationship between AI and Police. The author questions the transparency, accountability and data protection. If AI is collecting data then who owns it. The autho also questions about breaching of data when sensitive data is used and the responsibility of authorities.

42. **Kevin Strom (2016),** in this report, has emphasized on few technological advancements like license plate readers, crime mapping, body- worn cameras, etc. it examines the prevalence of technology in law enforcement and also, to what extent it is controlling the prevention of crime.

43. **Erik Fritsvold (2016),** this blog talks about specific seventeen technologies that would transform the policing practices. The technologies used in India are briefly explained and how it helps police is also discussed.

3) Research Gaps-

I. Existing literature focuses on the pros and cons of technological tools in India widely, but no study is based especially in context of Uttar Pradesh police systems and use of technological tools by them.

II. In spite of technological tools used like predictive policing, cyber stations, CCTNS, no comprehensive empirical analysis of its effectiveness has been done.

III. Technological tools in police practices in UP are being implemented, but research mainly discusses potential benefits rather than actual results like crime control.

IV. There is no study carried out deeply to understand about the challenges and limitations experienced in using technological tools in policing practices and crime control.

4) Statement of the Problem -

According to the reports, UP ranks highest in crime. Traditional methods used by police personnel for crime control being inefficient could not deliver the intended results. There was requirement of efficiency, admissibility of technological tools, reliability, speedy investigation, prompt action, due to which the shift to modern technological tools was mandatory. Many technological tools were adopted and implemented in UP.

The modern technological tools has definitely made simple for the police personnel, especially in Uttar Pradesh, but only being available is not enough. It also depends on capability of police personnel to have greater awareness of operating, understand and use it in daily policing practices.

Most of the existing studies focus on national level policing reforms in India and global use of technological tools. There is lack of empirical studies at Sate level, i.e., Uttar Pradesh, and no empirical correlation established between use of modern technological tools and actual

improvement in crime control in Uttar Pradesh**.** There is no detailed empirical data on how modern policing tools is being used in Uttar Pradesh in real practice and no systematic study measuring the level of training, awareness, and digital competence of police personnel in Uttar Pradesh. Existing literature underlines the need for training and not factual result. There is a lack of doctrinal research examining how Indian courts assess, admit, and assign evidentiary value to digital evidence collected through modern law enforcement software, particularly in the context of Uttar Pradesh.

Therefore, the study examines **the impact of modern technological tools in police** and **crime** control, with stakeholder perception as a supporting variable.

5) Significance of the Study –

I. The study will be useful to suggest reform towards how use of modern law enforcement software in policing practices can be made more effective and result oriented in police departments in Uttar Pradesh.
II. It will be based on empirical data and field-based analysis, hence, making the findings reliable and useful for real-world implementation.
III. The study will provide valuable inputs for policy formulation and reforms, especially in strengthening digital policing initiatives and administrative efficiency.
IV. It will highlight how the use of systems like Crime and Criminal Tracking Network and Systems (CCTNS) can make crime detection, investigation, and data management more efficient and systematic.

6) Research Objectives-

I. To understand and explain the types, nature, scope, use and functioning of technological tools in policing practices and crime control in Uttar Pradesh.
II. To analyse legal gaps and challenges in constitutional and existing legal framework relating to use of technological tools in policing practices and crime control.

III. To study case laws to ascertain how Indian judiciary sees, perceives and assesses the use of modern technological tools use in Policing practices and crime control.

IV. To analyse to what extent technological tools have improved policing practices and crime control.

V. To empirically investigate the perception of stakeholders related to effectiveness and impact of technological tools in policing practices and crime control in UP.

VI. To suggest reforms in laws and policies for improving effectiveness and the integration of technological tools in policing practices and crime control.

7) Research Questions –

I. What is the types, nature, scope, use and functioning of modern technological tools in policing practices and crime control in Uttar Pradesh?

II. What legal gaps and challenges in constitutional and legal framework can affect effective use of technological tools in policing practices and crime control?

III. How Indian judiciary sees, perceives and assesses modern technological tools in policing practices and crime control?

IV. How the use of modern technological tools has improved the policing practices and crime control?

V. What are the perceptions of concerned stakeholders regarding the effectiveness and impact of technological tools in policing practices and crime control?

VI. What reforms and changes in existing legal framework can be useful to improve effectiveness and the integration of technological tools in policing practices and crime control?

8) Research Hypothesis –

H1: The use of technological tools improves the policing practices and crime control.

H2: There exist significant legal, operational and other challenges and limitations towards the effective implementation and use of technological tools in policing practices and crime control.

H3: Judiciary in India faces challenges and limitations towards shaping and regulating the use of technological tools in policing practices and crime control.

9) Research Methodology –

Research Design -

The present study will use a combined method approach to study the problem. It will include doctrinal Research and Non doctrinal research . The doctrinal research will be using Analytical Research design whereas the Empirical Research designs will be used to gain insights from the survey areas. The data will be collected from Primary and Secondary Sources for Quantitative and Qualitative Research.

1. **Primary Sources of Data:** The questionnaire, interviews from stakeholders including police officers, cyber experts, retired judicial officers, prosecutor.
2. **Secondary Sources of Data:** NCRB reports, official data of UP police, annual crime reports, books, journals, police official websites.

Universe and Sample size of the study -

Universe-

The **Uttar Pradesh** will consist universe of the study. Three districts namely Kanpur, Lucknow and Ghaziabad will be taken to study the perceptions of the stakeholders consisting of Police persona, advocates, retired judges, cyber experts and prosecutors.

Sampling Technique-

The present study will adopt a non-probability sampling technique. The purposive sampling, method will be used to ensure representation of relevant stakeholders involved in policing and law enforcement in Uttar Pradesh. Purposive sampling is used to select respondents with relevant knowledge and experience, such as police personnel, advocates, cyber experts, and retired

judicial officers.

Sample Size of the study-

The total sample size for the study will be 500 respondents, distributed as follows: 300 Police Personnel from chosen districts, 100 Advocates practicing in criminal laws**,** 50 Cyber Crime Experts and 50 Retired Judicial Officers and Public Prosecutors will be interviewed to gain their perceptions on the topic of the research.

Data analysis-

Questionnaire, focused interview discussion and observational methods to collect data will be used. Data collected will be interpreted through descriptive and inferential statistics.

10) Limitations of the study –

I. The study is geographically limited to Uttar Pradesh, and findings may not be fully generalizable to other states or countries.
II. There may be response bias in questionnaires and interviews due institutional constraints.
III. Rapid technological advancements may make some findings time-bound or subject to change.

11) Work plan of study –

Chapter 1: Introduction
Chapter 2: Conceptual Framework and Evolution of Policing Technology and Crime Control
Chapter 3: Legal and Judicial Response
Chapter 4: Modern Policing technological tools in India and Uttar Pradesh
Chapter 5: Perceptions of Stakeholders in Uttar Pradesh Police
Chapter 6: Findings, Conclusion and Suggestions

Chapter 7: Recommendations

Phase	Duration	Work
Phase 1	**1-4 Months**	**Preparation of collecting data from interview and questionnaire. Identifying the stakeholders like police personnel, cyber experts, public prosecutors.**
Phase 2	**5-7 Months**	**Taking interviews, collecting questionnaires from stakeholders, collecting data from secondary sources.**
Phase 3	**8-10 Months**	**Analyzing the data collected of efficiency and effectiveness of policing tools.**
Phase 4	**11- 13 Months**	**Writing chapters and assembling all the data relevant to it.**
Phase 5	**14-19 Months**	**Taking feedback of supervisor, checking plagiarism**
Phase 5	**20-24 Months**	**Finalizing the content and proper formatting.**

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- Bharatiya Sakshya Adhiniyam, 2023
- Indian Penal Code, 1860
- Code of Criminal Procedure, 1973
- Indian Evidence Act, 1872
- Police Act, 1861
- Uttar Pradesh Police Regulations
- Model police Act, 2006

Online Databases:

- Scopus
- JSTOR
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